

REMARKS

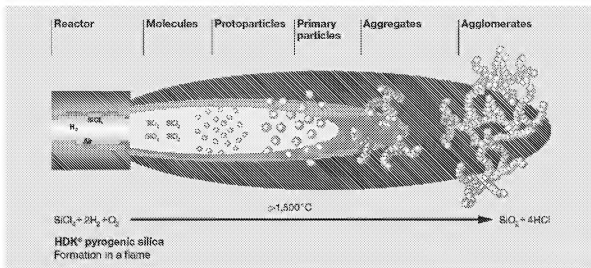
Claims 1-26 are pending in the present case. In the Office Communication mailed September 14, 2010, the Examiner maintained the following rejections:

- I. Claims 1-10 and 12-14 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Angeletakis et al. (US 6,121,344);
- II. Claim 15 stands rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Angeletakis et al. (US 6,121,344);
- III. Claims 16-24 and 26 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Angeletakis et al. (US 6,121,344);
- IV. Claim 11 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Angeletakis et al. (US 6,121,344) as applied to claim 1 above, and further in view of Teramae et al. (US2002/0022677); or further in view of Sato (US 5,773,489); and
- V. Claim 25 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Angeletakis et al. (US 6,121,344) as applied to claim 16 above, and further in view of Teramae et al. (US2002/0022677); or further in view of Sato (US 5,773,489).

Applicants respectfully disagree for the reasons made of record in the Amendment and Response filed on July 6, 2010, which are incorporated herein by reference, and offer the following additional remarks.

In the Final Rejection mailed on September 14, 2010, the Examiner asserts that AEROSIL OX-50 fumed silica has an alleged average particle size of 40 nm (page 10, second paragraph) and CAB-O-SIL TS-530 fumed silica has an alleged average particle size of 20 nm (page 10, first paragraph). However, this is not correct. As explained in the Amendment and Response filed on July 6, 2010, the particle size recited in Angeletakis with respect to AEROSIL and CAB-O-SIL fumed silica preparations is the primary particle size from which the fumed silica aggregate is formed. The primary particles **do not exist** as free particles, but are irreversibly aggregated into larger formations. The fumed silica product simply does not contain nanoparticles of the primary particle size.

The formation of aggregates from primary particles in pyrogenic silica is well illustrated in the Wacker-HDK brochure attached hereto¹. Page 6 of the Wacker brochure is illustrative of this manufacturing process. As shown in the figure at the top of page 6 (reproduced below) and explained in the text on the same page, in the flame pyrolysis method, volatile chlorosilanes are introduced into an oxyhydrogen flame to produce primary SiO₂ particles about 5-30 nm in size (Wacker HDK page 6).



The primary particles formed in the flame then sinter together permanently to form aggregates (Wacker HDK page 6). Individual primary particles therefore only exist in the reaction zone itself and are not present in either the input solution or in the final preparation of fused silica. (Wacker brochure, page 6, column 3, second paragraph). Thus, flame pyrolysis does not yield individual primary particles at all, but rather composite nanoparticles (aggregates) that consist of primary particles fused together by strong bonds.

According to the specification, the size of nanoparticles is obtained by laser diffractometry (specification at page 24, first paragraph). If the particle size distribution for the AEROSIL or CAB-O-SIL fumed silicas of Angeletakis were obtained by laser

¹ There are two major manufacturers of pyrogenic silica. The first is Degussa (now Evonik Degussa) manufacturing AEROSIL Products. The second is Wacker Chemie AG, manufacturer of Wacker-HDK. A similar diagram is shown on page 1 of the CAB-O-SIL brochure provided on July 6, 2010.

diffractionmetry according to the specification, the measurement would reflect the size of the aggregates, *i.e.*, the composite nanoparticles, having an average particle size of typically 200-300 nm (see, for example, page 1 of the CAB-O-SIL brochure provided with the Amendment and Response filed on July 6, 2010), not the size of the primary particles.

Since the average particle size for the fumed silica referred to in Angeletakis is 200-300 nm, not 40 nm, this reference simply does not teach a dental composite in which at least 50% by weight of the nanoparticles have a particle diameter of less than 200 nm.

The Examiner alleges that the diameter mentioned in claim 1 could be interpreted to be the diameter of primary particles. However, the claim wording precludes such an interpretation. Claim 1 requires that at least 50% by weight of the nanoparticles have a particle diameter of less than 200 nm. Primary particles fused into composite particles having diameters of greater than 200 nm no longer exist as nanoparticles of the smaller diameter and thus do not provide nanoparticles having diameters of less than 200 nm.

Claim 1 further requires that at least 20 particle number-% of the nanoparticles are aggregated particles. Since primary particles are not themselves aggregated but are instead used to form larger aggregates, the referenced "nanoparticles," in order to have a consistent meaning for this term, cannot be referring to primary particles within an aggregate. Applicants submit that, from the wording of the claim as a whole, it is clear that the nanoparticle diameter recited in Claim 1 is that of the ultimate nanoparticles and *not* the diameter of primary particles from which the nanoparticles may be composed.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. MPEP 2131, citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). For the reasons recited above, Applicants submit that Angeletakis fails to teach each and every feature of Claims 1-10, 12-24, and 26, and therefore fails to anticipate these claims. Applicants respectfully request that these rejections be withdrawn.

IV. Claim 11 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Angeletakis et al. (US 6,121,344) as applied to claim 1 above, and further in view of Teramae et al. (US2002/0022677); or further in view of Sato (US 5,773,489).

Claim 11 depends on claim 1. As pointed out above, Angeletakis et al does not teach or suggest the basic composition of claim 1. Neither Teramae nor Sato, if combined with Angeletakis, cure this deficiency.

While Applicants do not acquiesce that other elements necessary for establishing prima facie obviousness have been met, Applicants submit that the combination of Angeletakis with either Teramae or Sato does not teach or suggest all the features of Claim 11. Applicants respectfully request that this rejection be withdrawn.

V. Claim 25 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Angeletakis et al. (US 6,121,344) as applied to claim 16 above, and further in view of Teramae et al. (US2002/0022677); or further in view of Sato (US 5,773,489).

Claim 25 depends on Claim 16. As pointed out above, Angeletakis et al does not teach or suggest the basic composition of claim 16. Neither Teramae nor Sato, if combined with Angeletakis, cure this deficiency.

While Applicants do not acquiesce that other elements necessary for establishing prima facie obviousness have been met, Applicants submit that the combination of Angeletakis with either Teramae or Sato does not teach or suggest all the features of Claim 25. Applicants respectfully request that this rejection be withdrawn.

CONCLUSION

For the reasons set forth above, it is respectfully submitted that all grounds for rejection have been addressed and Applicants' claims should be passed to allowance. Should the Examiner believe that a telephone interview would aid in the prosecution of this application, Applicants encourage the Examiner to call the undersigned collect at (608) 662-1277.

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